Symons's Meteorological Magazine.

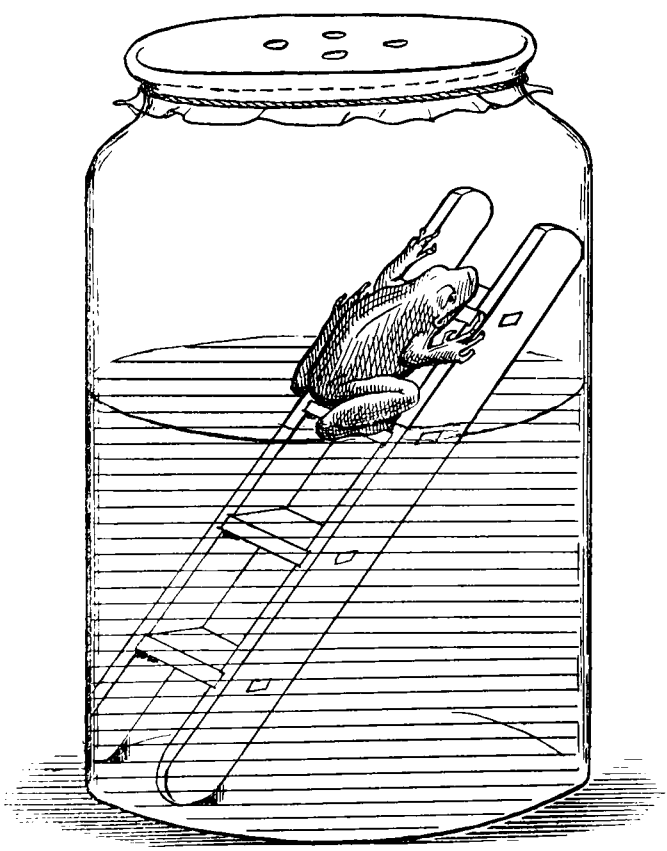
No. 496. MAY, 1907. Vol. XLII.

WEATHER WHIMS.—II.

THE FROG'S LADDER.

By Richard Inwards.

Much discredit has been thrown upon the weather indications of animals, but if there is one which has retained the reputation of a prophet, albeit a croaking one, it is the green tree frog (*Hyla Arborea*).



In Germany and Switzerland this animal is commonly provided with a ladder, in a bottle half-filled with water, and he is carefully watched as to his behaviour in uncertain conditions of the atmosphere. Many observers have framed for themselves different rules based on his posture and activity. If he remained on one of the lower steps in the water it was considered a certain indication of bad weather to come; while if he emerged and sat upon the steps it was thought to foreshow fine weather, and the higher the step the finer the weather expected. He also is given to croaking loudly before a storm. Now if we look to the usual life and habits of this frog there seems really some reason to expect him to be at least experienced as regards the climatic conditions. In fine weather he skips about among the branches of the trees, actively catching flies, this goes forward all the summer, as long as there are any flies to catch. At the approach of winter he seeks the water and finds himself a bed in the mud until the following spring calls him out again to resume his fly catching occupation. He adheres to the leaves and stalks by the aid of gelatinous cushions on his toes, though precisely how he manages to release his hold so instantaneously, requires explanation. It is certain that he is a very active creature, and catches flies by rapidly protruding his tongue and drawing them into his mouth, after the manner of the toad.

The frog on the ladder, no doubt, keenly watches the weather conditions, and rises to look out for expected flies when the circumstances seem favourable. On the other hand, when the cold and damp remind him of winter he instinctively retires to bury his sorrows in the imaginary mud, which he seeks at the bottom of his prison.

I am indebted to the kindness of my friend Mr. Stroh for the outline of the frog-ladder, and for some particulars as to the behaviour of the animal.

CLIMATOLOGICAL OBSERVATIONS IN THE BRITISH EMPIRE IN 1905.

WE have hesitated for six months before publishing the accompanying annual summary of our monthly Climatological Table. The reason for this hesitation is not any doubt as to the accuracy or the interest of the figures themselves; but it is solely due to the tendency in the press and on the part of the public to generalize wildly on data which though suggestive are incomplete. Year after year our exposition of the annual summary has been treated by journalists on the keen hunt for sensation, as if it were an exhaustive study of the climatology of the empire. Did the temperature at Adelaide

on one summer day happen to be for a few minutes higher than the maximum recorded for the same year at Bombay, we were met the next week by a paragraph headed

AUSTRALIA HOTTER THAN INDIA,

and a month or two later letters of indignant repudiation reached us from the Antipodes. Did we venture in the summary to mention a few places in other continents where the absolute minimum in winter was as low as in Winnipeg, we had to write apologetic letters in reply to colonial protests against our ignorant leanings towards "the Siberian theory of Canada." The whole thing is laughably absurd. The journalistic eye rarely falls, or lingers should it fall, on the monthly or even the annual tables of plain official figures; but the moment the sense of these figures is expressed in lower case print, the unhappy words are seized upon, and crystallized into a generalization which is sometimes almost an untruth, by the ruthless suppression of explanatory statements. In fact it would not surprise us in the least if in an early batch of press-cuttings we find one founded upon the present article to this effect: —

"AUSTRALIA 69·9 DEGREES HOTTER THAN INDIA.

"It is asserted in a recent number of *Symons's Meteorological Magazine* that Australia is hotter than India. A considerable mass of detailed statistics is adduced in favour of this novel theory, from which we gather that the temperature in the former country was 109·7 deg., and in the latter 39·8 deg., in the year 1905."

Deductions quite as curious have been drawn from earlier articles on the Climatological Table. The fact is of course that it is impossible to condense into a journalistic crystal the truth regarding so complicated a series of phenomena as those which make up the climate of a vast area of land lying in every latitude, from within the polar circle to the equator, the more so when only twenty-five widely scattered stations are available for comparison.

It may be pointed out that imperfect as this conspectus of the climate of the empire is when one attempts by means of it to describe the infinite variations it sums up, it has appeared in our pages monthly since March, 1882, a period of more than 25 years without a break, and that no such complete statement of the climate of different parts of the King's dominions is compiled or published anywhere else. We fully appreciate its value, and are proportionately grateful to the staff of the twenty-four observatories whose punctual kindness makes the Table possible. We commend this summary of the twelve monthly tables for 1905 to our readers, with the foregoing apology for the omission of the descriptive article which used formerly to appear on the occasion.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE FOR 1905.

Stations. *Those in Italics are South of the Equator.*	Absolute. Maximum. Temp.	Maximum. Date.	Minimum. Temp.	Minimum. Date.	Average. Max.	Min.	Mean.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Rainfall. Depth.	Days.	Average. Cloud.
	°		°		°	°	°	°	%	°	°	in.		0—10
London	85·3	July 26	21·2	January 16	58·2	43·4	50·8	46·2	83	134·6	17·5	22·97	162	6·4
Malta	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lagos	93·0	Mar. 9, 13, 14	69·0	Feb. 6, Jun. 13, Oct. 16	86·0	75·0	80·5	73·2	76	146·0	60·0	65·11	122	6·2
Cape Town	98·1	January 16	38·2	August 15	69·9	54·4	62·1	53·4	73	...	...	30·15	102	4·3
Durban, Natal.	90·7	December 18	45·4	June 14	78·1	61·4	69·8	...	...	154·2	...	44·95	153	4·8
Johannesburg	87·8	October 18	28·7	June 12	69·4	49·6	59·5	46·0	69	164·0	12·0	23·05	101	2·9
Mauritius	89·0	November 17	52·3	August 2	80·8	67·4	74·1	66·3	79	156·4	42·7	68·03	207	6·5
Calcutta	106·1	June 16	45·9	February 10	85·9	69·8	77·9	68·6	75	166·2	39·9	69·76	91	5·1
Bombay	94·7	October 8	56·1	January 31	86·0	74·4	80·2	70·4	74	144·5	47·3	33·66	89	3·9
Madras	107·9	May 29	57·4	January 29	91·7	75·3	83·5	71·3	73	152·1	52·8	42·72	85	4·5
Kodaikanal	74·7	May 5	39·8	January 29	65·1	51·1	58·1	48·5	74	149·0	18·5	59·96	164	5·3
Colombo	93·7	March 6	67·2	January 14	87·1	75·9	81·5	73·6	80	157·5	61·5	65·31	168	5·4
Hong-Kong	91·3	July 18	42·8	February 10	76·0	67·9	72·0	65·3	80	148·5	...	70·98	145	7·1
Melbourne	108·5	Jan. 11, 13	32·0	Aug. 2, Sep. 18	66·2	49·0	57·6	46·7	72	165·4	24·5	25·64	129	6·2
Adelaide	109·7	January 12	34·8	August 21	70·2	51·3	60·8	46·9	62	168·4	30·3	22·28	131	4·9
Coolgardie	108·5	January 20	32·4	August 11	76·5	51·1	63·8	45·2	52	178·8	24·2	7·86	58	3·3
Sydney	98·1	November 17	38·6	July ...	69·5	55·4	62·5	51·1	71	134·9	29·3	35·03	216	4·7
Wellington	77·0	February 5	30·5	June 5	60·3	49·2	54·8	46·4	74	139·0	27·0	51·07	175	6·3
Auckland	78·5	January 19	37·0	June 5	63·6	51·9	57·7	50·1	76	143·0	31·0	39·82	173	5·1
Jamaica	91·6	July 15, 19	62·9	January 27	85·9	71·6	78·7	71·9	79	...	..	55·24	112	...
Grenada	89·4	Apr. 1, Aug. 13	68·0	February 1	83·3	73·8	78·6	71·6	77	154·0	...	77·89	244	3·9
Toronto	92·1	July 18	— 8·2	February 4	53·5	36·5	45·0	38·2	78	...	—14·0	31·26	140	5·9
Fredericton	88·7	June 16, Aug. 12	— 33·5	January 15	51·8	28·2	40·0	27·1	57	...	...	32·69	105	5·3
Winnipeg	86·8	July 10	— 39·1	January 10	46·8	25·4	36·1	...	...	...	...	20·36	96	5·0
Victoria, B.C.	84·2	July 8	22·7	February 12	55·7	44·6	50·2	...	...	...	...	22·98	140	5·9
Dawson	85·7	June 24	— 50·5	January 26	33·6	16·8	25·2	...	...	...	...	15·44	79	...

STORMS AND THE SOURCES OF THEIR ENERGY.

By D. T. SMITH, M.D., Louisville, Kentucky.

NOTWITHSTANDING the diligent research of recent years, there still remains a number of questions unsettled relating to the origin and working of cyclones.

Since the heated air arising every day from islands that experience a sea-breeze must take the form of a cyclone, and since a large proportion of cyclones is known to originate in regions of the ocean where islands abound, it is worth while to inquire whether or not the origin of most, if not all, cyclones can be traced to the gyrating masses of air that rise daily from tropical islands. To this question time and observation must bring the answer. The full discovery of the source of the energy of cyclones must, however, continue to depend largely on inference and reasoning. The energy released in the form of heat by condensing vapour is no longer considered by the best thinkers at all adequate to the production of the tremendous dynamic results witnessed in cyclonic movement.

In addition to the energy that may be derived from the classic source of condensation of moisture, there appear at least two other sources of energy deserving of consideration. One of these is the momentum with which the trade winds rise as they recurve along the borders of the doldrums to become the anti-trades, and later the prevailing easterlies of temperate zones, and the other the decapitation of cyclones by the prevailing overcurrent.

As long as the cyclone is moving to the westward along the line of the trade winds and the doldrums, the ascending trades must continuously enter into and be incorporated with it, carrying with them the energy of their momentum. But the vast preponderance of the energy of cyclones, both for rotation and progression, would seem to be derived from their decapitation by the prevailing overcurrent.

The principle upon which this may be effected is well exhibited in the well-known machine designed for spraying perfumes, but now largely employed by medical men and painters. This well-known instrument consists of two tubes—a horizontal and an upright one—set at right angles to each other in such a way that air blown through the horizontal tube is projected immediately over the upper extremity of the upright tube. The upright tube extends down into the liquid to be sprayed, and when air is blown through the horizontal tube the liquid rises up and is driven onward as spray. This rising of the liquid indicates that the air has been removed from the end of the upright tube faster than it can descend, and that a partial vacuum has been produced at that point.

A cyclone may be regarded as a mountain of atmosphere lifted up to a certain degree by the momentum of the inrush of air at its base, and to this extent it is constituted a "low."

But the top of this mountain is continuously torn off and carried

away forward by the upper or anti-trades, if it is near the tropics, and by the constant easterly overcurrent if it is in the temperate zones. The decapitated mountain, already hollowed out at its base as it is, as regards its gravity, by the momentum of the upward moving core, is thus constituted doubly a "low," into which the air around is constantly pressed.

It is obvious that if the horizontal trajectory of the prevailing overcurrent were equal to the rate of descent of the air above the line of decapitation, the barometric pressure at the Earth's surface over such area would be that due to the weight of the air below that level, or probably about sixteen inches of mercury. But it is rare that the depression in the centre of a cyclone amounts to as much as one inch of mercury, and this ought easily to be effected by the overcurrent moving at the rate of 200 or more miles an hour.

The energy imparted to the cyclone by this continuous decapitation may also be invoked to explain its progression. Since the speed of successive strata of the overcurrent is progressive from below upward, the decapitation of the cyclone must be accompanied by a dragging action that causes the upper part of its mass to lean forward in the direction of advance. This leaning gives to the mass of atmosphere entering the cyclone form in front, an advantage over that coming into it from the rear. That is to say, even if it were stationary, a mass of air starting from the Earth's surface in front of it, would reach a given point on its body in less time than a like mass starting from a place equally removed in the rear could reach a corresponding point; and still more must this be the case when the cyclone is advancing.

This must result in re-forming the centre continuously in advance; and since the centre of gravity thus continuously advances, the whirling cyclone must also advance in order that its axis of rotation may continue coincident with its centre of gravity.

The uniform occurrence of anticyclones on the north-western quadrant of cyclones would seem to indicate a causal relation between the two, and suggests an enquiry as to whether the pursuing anticyclone does not derive its energy from the cyclone.

The rotation of the cyclone in temperate regions carries the mass constituting its poleward rim full against the prevailing overcurrent, and this must have the effect of damming back or heaping up the air on its poleward side. To the extent to which this might happen, and the extent to which the air might be drawn into the narrowing meridians to the north, there would be produced a "high" or anticyclone.

It is also a question whether the increased radiation of heat from a clear atmosphere may not also be a source of energy. The contraction of an anticyclonic mass, due to loss of temperature by radiation, would result in a descent with a momentum corresponding to the average descent of its particles, and this must to an equal extent affect the barometer.

The breeze blowing out from the shadow of an eclipse may be largely, if not wholly, due to such a cause. The air round the area of the shadow could hardly be supposed to flow into the depression due to the contraction in the short time available rapidly enough to be the cause of the outflow.

The momentum of the air descending in a cyclone, and reacting as it is deflected at the Earth's surface, would also seem to some extent to increase the barometric pressure.

In the case of tornadoes also, the energy may be due to the beheading effect of transverse currents derived from cyclones, and it may be occasionally from anticyclones. Where tornadoes spring from cyclones rising masses of air with their energy might become incorporated with them, but this could not well occur in the case of such as grow out of anticyclones.

THE RAINFALL OF APRIL, 1907.

THE remarkable dryness which prevailed in most parts of the country during January, February and March, has been in some measure redressed by the heavy rainfall of the south of England in April.

Our Tables show that the wettest part of the country in relation to the average was the centre of the south of England from the river Thames southward, though not reaching to the coast. Over most of the counties which have the Thames as their northern boundary and westward into Wiltshire more than twice the normal rainfall for April fell. The Rev. H. A. Boys, writing from North Cadbury before the end of the month, remarked, "the first week of April was wetter than February, the second week was wetter than January, the third week was wetter than March, and the three first weeks of April had an inch more rain than the first quarter of the year." Throughout the greater part of the south of England April had more rain than the three preceding months.

A broad belt of the north of England from North Wales to the North Riding of Yorkshire had less than the average rainfall, in some parts not two-thirds of the average, and a similar dry belt crossed Scotland from Cantyre to Aberdeen. To our deep regret the observers, on whose enthusiastic interest we have relied for many years for observations at Colmonell in the south-west and at Riddell House in the south-east of Scotland, have been removed by death, and our summary of the month is rendered incomplete.

In considering the four months of the current year, we find that the only part of England in which the rainfall has appreciably exceeded the average is in Norfolk and the north of Suffolk. In Scotland the western half of the country, and in Ireland the extreme north, have also had more than the normal rainfall. The driest parts of the British Isles for the four months have been three narrow strips on the coast, in each of which less than 75 per cent. of

the average rainfall was recorded. These were (1) the east coast of Scotland and England from Aberdeen to Hull, (2) the western promontories of North Wales, South Wales, and probably Cornwall, and (3) the south coast of Ireland.

ROYAL METEOROLOGICAL SOCIETY.

THE usual monthly meeting of this Society was held on Wednesday evening, April 17th, at the Institution of Civil Engineers, Great George Street, Westminster, Dr. H. R. Mill, President, in the chair.

A paper by Mr. R. L. Holmes, on the "Phenomenal Rainfall in Suva, Fiji, August 8th, 1906," was read by the Secretary in the absence of the author. This was an account of a very remarkable fall of rain which occurred during a thunderstorm at Suva, the capital of Fiji, on the night of August 8th. Unfortunately the exact amount had to be, in part, estimated, owing to the observer failing to measure the fall at intervals during the night. Very little rain fell before sunset, but from 6 p.m. it continued a ceaseless downpour until sunrise the next day. At 10 p.m. the gauge was found overflowing, with 12·50 in. of rain in it. Four hours later, at 2 a.m., on the 9th, the gauge was again overflowing, and at 6 a.m. it was overflowing once more; that is three times in 12 hours. Very little rain fell after 6 a.m. These measurements show a fall of over 37 inches, without taking into account the overflowings, which are an unknown quantity. As the gauge was 25 feet above the ground, Mr. Holmes is of opinion that the rainfall should be increased by about 11 per cent., and he calculates that the total fall must have been fully 41 inches in about 13 hours, which he thinks surpasses anything that had been recorded in any other part of the world in so short a space of time.

An interesting discussion followed the reading of this paper. Mr. Bayard and Captain Hepworth thought it was a pity that Mr. Holmes had not told them more about the rain gauge, and also about the construction of the roof.

Mr. Bentley said that the paper once more illustrated the necessity for the larger and adequate capacity of rain gauges, and more especially in tropical countries.

Mr. Bryant said that they found at the Royal Observatory, Greenwich, that a rainfall on the roof showed a deficiency compared with a rainfall near the ground, varying from 100 per cent. to nothing, or even less, according to the rate of fall and other conditions.

Mr. Marriott said that he would like to have known something of the atmospheric conditions prevailing at the time. If an isobaric chart had been prepared, they would probably have had some information as to the conditions under which the rain fell. The question of the percentage to be added for the rain gauge being 25 feet above the ground would depend upon the character of the wind at the time.

The President said that the amount of rain collected in high and low gauges varied extremely under different circumstances. In very heavy rain there was less difference in the catch of high and low gauges than in light rain, and in heavy rain, in still weather, actually more rain had sometimes been caught at a great elevation than on the ground. The total amount of wind in the twenty-four hours during which the remarkable fall occurred, was 96 miles, averaging only 4 miles per hour. This was very little, and one would expect that the amount of rain falling at 25 feet above the ground would be very nearly the same as at one foot, so that the 11 per cent. addition was probably unnecessary, or at least it was too great.

A paper by Mr. R. Strachan on the "Temperature around the British Islands in relation to the Gulf Stream," was read by the Secretary. This was based on observations made in the year 1906, which have been published by the Meteorological Office. Around the British coasts the temperature of the air was lowest in February, and highest in August; the temperature of the sea corresponded to these epochs with slight interruptions, having been lowest in January for the west and central, in March for the south, and highest in September for the north, and in July for the east, positions. The water in the Strait of Florida was about 30° warmer than the sea at the north of Scotland.

Captain Hepworth, Dr. Dickson, Mr. Matthews, Dr. Theodore Williams, and the President, took part in the discussion, and Mr. Strachan replied.

Mr. L. C. W. Bonacina also read a paper on "Weather regarded as a function of Climate," in which he dealt with the philosophy of the science.

Dr. Shaw, Mr. Strachan, Mr. J. E. Clark, Mr. Bryant, and the President, said a few words on the subject of the paper, and Mr. Bonacina replied.

The following gentlemen were elected Fellows of the Society :— Mr. C. A. O. Buyzer, Mr. D. W. Freshfield, Mr. A. P. Harcourt, Mr. J. E. H. Hill, B.Sc., Mr. W. C. Lane, Capt. C. W. D. Lynch, Capt. S. C. Peacock, Mr. S. M. Shafi, Mr. J. Turner, Mr. T. Tyrwhitt, and Mr. P. D. Warren, Assoc.Inst.C.E.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE PAST WINTER IN AUSTRIA.

I NOTICE in the last issue of your Magazine that you have experienced remarkably fine weather during the month of March. With us the weather was abominably cold and wet, with much snow in the

mountains. In the northern Alps the people do not remember a winter with such quantities of snow as that which is just past. Avalanches have wrought havoc, and are still of frequent occurrence. All communications by the Arlberg route, both by road and rail, were completely interrupted for more than a fortnight. Even yet the weather continues cool and rainy.

J. HANN.

Wien, 20th April, 1907.

WHAT IS THE MAXIMUM TEMPERATURE OF A DAY?

In the discussion of the records of a Callendar electrical temperature recorder in the Transvaal, there occasionally arises some uncertainty as to the meaning of the term "maximum temperature of the day." The normal daily temperature record resembles a simple sine curve with a definite maximum at about 3 p.m., and a well-marked minimum about 5 a.m. These conditions allow of no ambiguity as to the meaning of the term "maximum temperature," as this temperature is represented by the peak of the curve. It also satisfies the mathematical definition of a maximum value, in that it is greater than all temperatures in the immediate neighbourhood of it on either side. But occasionally there are days on which the whole of the High Veldt is enveloped in a thick wet mist, through which the sun does not penetrate during the whole time it is above the horizon. On such days the temperature may fall continuously from midnight, and reach its lowest point during the afternoon, and then slowly rise again during the night. Hence the temperature record approximates to a smooth curve which is wholly concave upwards. Considering temperature as a single-valued continuous function of time, such a curve possesses no maximum, and hence, strictly speaking, there is no maximum temperature on that particular day. However, although not possessing a maximum value, a continuous function must possess a greatest and least value, but to specify these, definite limits must be given to the range of the function. At the majority of the stations in the Transvaal, thermometric observations are taken only once a day, viz., at 9 a.m., and the reading of the maximum thermometer, as then read, is entered to the previous day. But when a bright day follows a damp misty day, the temperature of the air at 9 a.m. is frequently several degrees higher than the highest temperature of the previous day. Hence the reading of the maximum thermometer at that time is not a correct representation of the conditions of the previous day. This being so, would it not be advisable in determining the mean maximum temperature of a station for a month or a year, to leave out all those readings of the maximum thermometer which were not greater than the readings of the dry bulb thermometer at 9 a.m., and similarly all readings of the minimum thermometer which were not lower than this reading? This process

should give a more correct value to the means of the maximum and minimum temperatures.

Where the maximum temperatures are obtained from continuous records, and the curve has a crest lying within the limits midnight—midnight, then the temperature corresponding to the crest should be taken as being the maximum temperature of the day, although this might possibly be lower than the temperature at either midnight.

H. E. WOOD.

Transvaal Meteorological Department, Johannesburg, 22nd April, 1907.

[The same difficulty arises not infrequently in the British Isles, especially in winter when the temperature of the air depends less on solar radiation than on the direction of the wind; but we believe that most meteorological observers use the words maximum and minimum as synonymous with highest and lowest, irrespective of the form of the curve of diurnal temperature. The highest temperature has sometimes to be entered to a day on which it did not occur or it would not be entered at all, though obviously when the highest temperature occurs at or before 9 a.m. it has not the normal character of a daily maximum.—ED., *S.M.M.*]

REVIEWS.

Grundzüge einer Theorie der synoptischen Luftdruckveränderungen [Principles of a Theory of Synoptic Weather Changes]. Von DR. FELIX M. EXNER. Aus dem Sitzungsberichten k. Akad. Wiss. Mathem-naturw. Klasse. Bd. CXV. Abt. IIa. Wien, 1906. Size $9\frac{1}{2} \times 6\frac{1}{2}$. Pp. 76.

TAKING advantage of the numerous records of self-registering instruments in different parts of the United States preserved in the Weather Bureau at Washington, Dr. Exner prepared a series of isobaric and isothermal charts for the month of January, 1895, for every four hours, *i.e.*, six of each set of charts for each of 31 consecutive days. By the study of these charts representing atmospheric conditions over a very wide area at short intervals of time, the process by which the consecutive changes resulting in the movement of centres of high and low pressure are effected, is ascertained. The result is subjected to mathematical discussion, and use is made especially of the height at which the variations of pressure from day to day shown in the charts ceases to be felt. The whole work is preliminary to a detailed study of similar conditions in Europe, where on account of the number of agencies at work and the diversity of the hours of observation, the problem is more difficult to attack than in America, where uniformity of observation prevails over an immense area.

Meteorological Observations at Bulawayo. By Rev. E. Goetz, S.J. Bulawayo, 1906. Size $8\frac{1}{2} \times 5\frac{1}{2}$. Pp. 30.

The Meteorological Observatory kept up by Father Goetz at Bulawayo has already been described in these pages (Vol. **40**, 1905, p. 205). We have received the pamphlet named above, which is reprinted from the *Proceedings of the Rhodesian Scientific Association*, and contains a full account of the records tabulated for the years 1897 to 1904. The striking feature about all the figures except rainfall is the remarkable uniformity from year to year. The mean temperatures, for instance, of the seven complete years running 66°·7, 67°·6, 68°·3, 67°·2, 67°·3, 67°·4, 65°·5, so that there is every reason to believe that the average of the seven years, 67°·3, is very close to the normal temperature of the locality. Rainfall varied from 17·58 in. in 1899 to 29·35 in. in 1901, and the alternation of the seasons was so marked that the average duration of the wet season was five months five days, with 21·19 in. of rain falling on 62 days, while the average dry season was six months twenty-five days, with only 1·12 in. falling on 9 days. The rainfall at Hope Fountain, 10 miles S. of Bulawayo, for the years 1898 to 1904 is also quoted.

Cape of Good Hope. Report of the Meteorological Commission for the year ending 31st December, 1904. Cape Town, 1906. Size $13 \times 8\frac{1}{2}$. Pp. 120.

The number of stations for rainfall observation in Cape Town had risen to 523 in the year 1904, but it is pointed out in this report that twice that number of rain gauges uniformly distributed over Cape Colony would barely suffice to enable the average distribution of rainfall over the country to be determined with a reasonable degree of accuracy. It is stated that rain gauges are particularly required in the mountainous districts, where recent investigations have shown that the amount of precipitation may be so enormous as to be almost incredible. We hope in an early number of the Magazine to refer at some length to the remarkable wetness of some of the valleys in the extreme south of Cape Colony.

Meteorological Observations made in Western Australia in 1904. Under the direction of W. Ernest Cooke, M.A., F.R.A.S. Perth, 1906. Size $13 \times 8\frac{1}{2}$. Pp. 144.

The Meteorological Department in Western Australia devoted attention to weather forecasts as well as to the collection of data, and Mr. Cooke notes with very reasonable satisfaction that the percentage of general forecasts for the whole State issued at 4 p.m., and published in the daily papers the following morning, came out as 90 correct, and only 2 wrong, while the special forecasts for Perth and neighbourhood issued at 9 a.m., were correct in 94 per cent. of the cases, and only wrong in one.

Meteorologische Zeitschrift. Hann-Band. Zum vierzigjährigen Redaktionsjubiläum J. Hann's von Freunden und Kollegen gewidmet: redigiert von DR. J. M. PERNTER, Wien, und Dr. G. HELLMANN, Berlin. [The Hann Volume, dedicated by the friends and colleagues of J. Hann, on the occasion of the fortieth anniversary of his editorship of the *Meteorologische Zeitschrift.* Edited by Dr. J. M. Pernter, of Vienna, and Dr. G. Hellmann, of Berlin.] Braunschweig, 1906. Size 12 × 8. Pp. x. + 404.

IT is usual in this country for the colleagues of a scientific man to pay him very handsome tributes of respect and appreciation in the form of obituary notices, not infrequently written in advance, and it is probable that many eminent persons would be agreeably surprised by the warmth of the expressions of their contemporaries' good-will were they privileged to peer into the columbaria of the newspaper offices' "graveyards." On the continent they have a more excellent way, and a favourite method of showing honour to a distinguished worker is for his friends and colleagues to mark some epoch in his life by the presentation of a volume compiled by them on the subject of his studies. That now before us is a typical example, and nothing in the way of a testimonial could be more appropriate than this substantial supplementary volume of the *Meteorologische Zeitschrift*, a publication which, thanks mainly to Dr. Hann's forty years of editorship, is recognised as the leading organ of meteorology in the world. There are, altogether, forty-two memoirs, most of them in German, but some in English or French, representing no less than thirteen different countries. It is impossible to enumerate them all, and we content ourselves with citing those which are given in English, viz. :—

Sir John Eliot.—Brief discussion of the observations of the solar radiation (or black bulb in vacuo) thermometers in India during the period 1892–1903.

W. N. Shaw.—The law of sequence in the yield of wheat for Eastern England.

Cleveland Abbe.—The trade winds and the doldrums.

A. Lawrence Rotch and L. Teisserenc de Bert.—The meteorological conditions above the tropical North Atlantic.

Cold Waves and Frost in the United States. Prepared under direction of Willis L. Moore, Chief U.S. Weather Bureau. By EDWARD B. GARRIOTT, Professor of Meteorology. Washington, 1906. Size 11½ × 9½. Pp. 22 + 328 charts. Price 30 cts.

A SHORT account is given of historical cold periods in the United States from 1717 onwards, and then a series of charts shows the isobars and isotherms of consecutive days in a large number of "cold waves" from 1888, each series extending over the period during which the "cold wave" was moving across the country.

Reduction of Greenwich Meteorological Observations. Part IV. Temperature of the Air as determined from the observations and records of the 15 years 1891 to 1905 made at the Royal Observatory, Greenwich. Now collected and discussed under the direction of SIR W. H. M. CHRISTIE, K.C.B., M.A., F.R.S., Astronomer Royal. Edinburgh, 1906. Size $12\frac{1}{2} \times 9\frac{1}{2}$. Pp. 68, price 3s.

A FRONTISPIECE is given showing the curves of the mean temperature, the mean maximum, and the mean minimum and extreme maximum and extreme minimum of the air for each day of the year on the average of the period 1841 to 1905. A series of tables gives the daily means of temperature for each month so far as regards the daily mean maximum, minimum and range for the period 1891 to 1905, with the highest, lowest and mean values for the 65 years, 1841 to 1905. The memoir is thus a supplement to the volume published in 1895, which dealt with the temperature of the air from 1841 to 1890; but it is more than this, because it makes a comparison between the 50 and 65 years, and gives, amongst many others, a table of the smoothed values of mean temperatures for the 65 years. A large number of other tables represent the data in every conceivable form in which they seem likely to be useful. We propose to give a summary of the constants of temperatures from this memoir in a future number.

Bericht über die Internationale Meteorologische Direktorenkonferenz in Innsbruck, September, 1905. (Report of the International Conference of Directors of Meteorological Institutions at Innsbruck). Wien, 1906. Size $11 \times 7\frac{1}{2}$, pp. 154.

THIS is the official report of the meeting of Directors of Meteorological Institutions which took place in Innsbruck, in 1905, on the initiative of the International Meteorological Committee. It contains a report of the proceedings at the meeting, the reports of various committees on matters relating to meteorology and terrestrial magnetism, and also a series of appendices dealing with many points of great interest, concerning which additional information is required and international co-operation desirable. Want of space alone prevents us from referring in detail to the points brought forward.

Rainfall at Ashburton. Forty Years' Record, by P. F. S. AMERY. (Reprinted from *Trans.* Devonshire Association, 1906). Size $8\frac{1}{2} \times 5\frac{1}{2}$. Pp. 8 + 3 plates.

A DISCUSSION of a valuable rainfall record on the south-eastern slope of Dartmoor, the author apparently not being the observer. Some emphasis is laid upon the 40 years' record yielding a driest year somewhat wetter than that usually assumed as the lowest likely to occur; but without information as to the pattern and exposure of the rain gauge (which is not given) no valid conclusion can be drawn.

Meteorology in Mysore, 1905. Thirteenth Annual Report. Pp. 56.

Report on Rain Registration in Mysore for 1905. Pp. 30. By JOHN COOK, M.A., F.R.S.E. Bangalore, 1906. Size $12 \times 9\frac{1}{2}$.

THE general Report contains a frontispiece showing the large and handsome building of the Mysore Government Central Observatory at Bangalore, and the observations of the year are discussed in considerable detail. The Rainfall volume contains a map of Mysore province showing the average annual rainfall for the 36-years' period, 1870—1905. This map would have gained in clearness if the shading indicating the areas of increasing rainfall had been made of increasing darkness, and not simply depending as they do on lines running at different angles. The map also appears in red instead of blue, the usual livery of rainfall maps. There is no reason why it should not be red, but at the same time the familiar colouring would afford a certain help to the eye in following the distribution.

METEOROLOGICAL NEWS AND NOTES.

DEATH OF DR. BUCHAN.—At the moment of going to press we learn with profound regret of the death of Dr. Alexander Buchan, F.R.S., which occurred at Edinburgh on May 13th. A sketch of Dr. Buchan's career as a meteorologist will be given in an early number.

DR. DOBERCK, Director of the Hong Kong Observatory, is, we are informed by *The Observatory*, about to retire from that position, which he has occupied since the year 1883.

A SELF-REGISTERING SNOW GAUGE is described by Dr. Hellmann in a recent number of the *Meteorologische Zeitschrift* (1906, Heft 8). The principle is that of a balance, like the Casella recording rain gauge. This Chionograph has a funnel surface of 64 square inches, all the snow entering which falls on the pan of a balance with a fixed counterpoise at the end of a curved lever, and the descent of the pan, which is always in equilibrium, as the weight on it increases, actuates a pen working on a drum as in the common aneroidograph. The pen has a range corresponding to 1·38 in. of rain, and then automatically drops to zero and makes a second ascent of the drum. Should more snow than corresponds to 2·76 in. of rain fall (*i.e.*, more than about 2 feet), it is necessary to change the receiving vessel on the plate of the balance.

TEMPERATURE FOR APRIL, 1907.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	TEMPERATURE. Max. °	Max. Date.	Min. °	Min. Date.	No. of Nights at or below 32° Shade.	Grass.
		° ′	° ′							
Camden Square	*London*	51 32	0 8	111	73·4	24	30·8	19	1	7
Tenterden	*Kent*	51 4	*0 41	190	71·0	24	30·0	19	2	15
West Dean	*Hampshire*	51 3	1 38	137	70·0	24	26·0	20	10	21
Hartley Wintney	,,	51 18	0 53	222	73·0	2,24	29·0	19,20	7	12
Hitchin	*Hertfordshire*	51 57	0 17	238	70·0	1	28·0	19	5	...
Winslow (Addington)	*Buckinghamshr.*	51 58	0 53	309	69·0	1,24	29·0	18	5	13
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	69·0	1,24	27·0	19	4	...
Brundall	*Norfolk*	52 37	*1 26	66	67·4	24	29·4	20	3	11
Winterbourne Steepleton	*Dorset*	50 42	2 31	316	69·0	24	28·5	4	5	11
Torquay (Cary Green)	*Devon*	50 28	3 32	12	69·0	24	35·2	18	0	6
Polapit Tamar [Launceston]	,,	50 40	4 22	315	64·0	1	30·6	5	3	13
Bath	*Somerset*	51 23	2 21	67	67·0	1,24	29·5	20	4	...
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	67·0	24	35·0	17	0	...
Church Stretton (Woolstaston)	*Shropshire*	52 35	2 48	800	64·5	1,24	20·0	18	23	...
Bromsgrove (Stoke Reformatory)	*Worcestershire*	52 19	2 4	225	65·0	1	26·0	17	9	...
Boston	*Lincolnshire*	52 58	0 1	25	68·0	1	30·0	18‡	6	...
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	67·3	1	28·9	18	6	15
Derby (Midland Railway)	*Derbyshire*	52 55	1 28	156	69·0	1	30·0	17	3	...
Bolton (Queen's Park)	*Lancashire*	53 35	2 28	390	63·0	2	28·4	18	1	10
Wetherby (Ribston Hall)	*Yorkshire, W.R.*	53 59	1 24	130	...	...	...	...	...	...
Arncliffe Vicarage	,, ,,	54 8	2 6	732	...	...	...	...	...	...
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	66·0	24	28·0	19	2	8
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	...	..	...	...	...	...
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	59·8	2	26·8	18	4	...
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	...	...	...	...	...	...
Haverfordwest (High Street)	*Pembroke*	51 48	4 58	95	62·0	24	32·2	5	...	5
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	65·0	24	26·0	19	...	...
Llandudno	*Carnarvon*	53 20	3 50	72	63·0	2	31·2	18	1	...
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	64·0	2	26·0	18	6	...
Lilliesleaf (Riddell House)	*Roxburgh*	55 31	2 46	550	...	...	...	...	...	...
Edinburgh (Royal Observy.)	*Midlothian*	55 55	3 11	442	61·8	2	28·4	18	1	8
Colmonell (Clachanton)	*Ayr*	55 8	4 54	140	...	...	...	...	...	...
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	64·0	2	30·0	17	2	16
Tighnabruaich	*Argyll*	55 55	5 14	50	52·0	21	28·0	17	8	8
Mull (Quinish)	,,	56 36	6 13	35	...	..	...	...	...	...
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	63·4	23	28·0	19	3	...
Braemar	*Aberdeen*	57 0	3 24	1114	...	...	...	...	...	...
Aberdeen (Cranford)	,,	57 8	2 7	120	58·0	1†	25·0	15,18	10	...
Cawdor (Budgate)	*Nairn*	57 31	3 57	250	...	...	...	...	...	...
Invergarry	*E. Inverness*	57 4	4 47	13c?	...	...	...	...	...	...
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	...	...	...	...	...	...
Dunrobin Castle	*Sutherland*	57 59	3 56	14	58·5	23	33·5	17	...	...
Castletown	*Caithness*	58 35	3 23	100	58·0	1	29·0	18	7	7
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	65·0	25	29·0	4	...	...
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	63·5	24	29·0	4	4	...
Broadford (Hurdlestown)	*Clare*	52 48	8 38	167	65·0	24	28·0	3	5	...
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	63·0	23	...	...	...	13
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	67·0	23	33·2	15	0	6
Ballinasloe	*Galway*	53 20	8 15	160	70·0	24	24·0	4,18	12	...
Clifden (Kylemore House)	,,	53 32	9 52	105	...	...	...	...	...	...
Crossmolina (Enniscoe)	*Mayo*	54 4	9 18	74	...	...	...	...	...	...
Seaforde	*Down*	54 19	5 50	180	62·0	23	30·0	17	3	6
Londonderry (Creggan Res.)	*Londonderry*	54 59	7 19	320	...	...	...	...	...	...
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	57·0	1,23	29·0	17	...	...

† and 21, 22, ‡ and 19, 20, 27, 28.

RAINFALL FOR APRIL, 1907.

RAINFALL OF MONTH.							RAINFALL FROM JAN. 1.					
Aver. 1870-99.	1907.	Diff. from Av.	% of Av.	Max. in 24 hours.		No. of Days	Aver. 1870-99.	1907.	Diff. from Aver.	% of Av.	Mean Annual 1870-1899.	STATION.
				in.	Date.							
in.	in.	in.					in.	in.	in.		in.	
1·69	3·22	+1·53	191	·49	6	18	6·82	6·27	— ·55	92	25·16	Camden Square
1·77	3·16	+1·39	179	·51	26	18	7·87	6·46	— 1·41	82	28·36	Tenterden
1·99	4·38	+2·39	220	·57	29	22	8·73	7·37	— 1·36	84	29·93	West Dean
1·69	4·42	+2·73	262	·54	12	19	7·91	7·58	— ·33	96	27·10	Hartley Wintney
1·62	2·62	+1·00	162	·55	30	15	6·50	5·78	— ·72	89	24·66	Hitchin
1·83	2·66	+ ·83	145	·51	30	19	7·23	5·87	— 1·36	81	26·75	Addington
1·54	2·85	+1·31	185	·68	30	19	6·43	6·69	+ ·26	104	25·39	Westley
1·68	3·21	+1·53	191	·67	30	23	6·49	8·09	+ 1·60	125	25·40	Brundall
2·60	4·89	+2·29	188	1·19	20	19	12·02	9·78	— 2·24	81	39·00	Winterbourne Stpltn
2·45	4·15	+1·70	170	·63	13	19	10·96	8·07	— 2·89	74	35·00	Torquay
2·23	4·37	+2·14	196	·87	2	22	11·35	10·22	— 1·13	90	38·85	Polapit Tamar
2·05	3·57	+1·52	174	·67	12	18	8·63	6·76	— 1·87	78	30·75	Bath
2·05	3·50	+1·45	171	·58	12	19	8·50	6·85	— 1·65	81	29·85	Stroud
2·14	2·93	+ ·79	137	·98	12	15	9·23	7·68	— 1·55	83	33·04	Woolstaston
1·66	2·02	+ ·36	122	·54	12	14	6·56	4·12	— 2·44	63	24·50	Bromsgrove
1·59	1·63	+ ·04	103	·30	4	16	6·09	5·01	— 1·08	82	23·30	Boston
1·69	1·70	+ ·01	101	·37	13, 21	15	6·56	5·30	— 1·26	81	24·70	Hodsock Priory
1·72	1·73	+ ·01	101	·23	13	23	6·82	6·02	— ·80	88	26·18	Derby
2·15	1·87	— ·28	87	·56	6	18	11·08	10·52	— ·56	95	42·43	Bolton
1·98	1·52	— ·46	77	·28	2	15	7·35	6·33	— 1·02	86	26·96	Ribston Hall
3·32	3·64	+ ·32	110	1·12	22	17	19·42	19·93	+ ·51	103	60·96	Arncliffe Vic.
1·72	1·59	— ·13	92	·32	30	16	7·17	5·37	— 1·80	75	27·02	Hull
1·79	2·53	+ ·74	141	·60	3	20	7·43	5·39	— 2·04	73	27·99	Newcastle
6·27	7·16	+ ·89	114	1·91	20	14	43·13	35·96	— 7·17	83	132·68	Seathwaite
2·34	3·78	+1·44	161	·80	12	22	12·11	10·06	— 2·05	83	42·81	Cardiff
2·67	4·36	+1·69	163	·85	20	19	14·53	10·47	— 4·06	72	47·88	Haverfordwest
2·39	2·54	+ ·15	106	·43	3	14	12·22	11·06	— 1·16	91	45·41	Gogerddan
1·82	1·12	— ·70	62	·16	3	15	8·33	6·02	— 2·31	72	30·98	Llandudno
2·30	2·87	+ ·57	125	·79	6	10	13·47	12·19	— 1·28	90	43·43	Cargen
1·96	...	...	...	...	...	...	9·37	..	...	...	33·04	Riddell House
...	1·31	...	...	·36	30	15	...	4·99	...	...	...	Edinburgh
2·25	...	...	...	...	...	...	13·62	...	...	...	44·85	Colmonell
1·77	2·38	+ ·61	135	·55	6, 10	13	9·88	10·86	+ ·98	110	35·80	Glasgow
2·89	2·61	— ·28	90	·55	6	12	17·68	18·07	+ ·39	102	57·90	Tighnabruaich
2·80	3·54	+ ·74	126	·59	3	20	17·38	17·71	+ ·33	102	57·53	Quinish
1·94	1·85	— ·09	95	·45	3	15	8·06	5·60	— 2·46	69	28·95	Dundee
2·18	3·69	+1·51	169	...	...	...	10·21	9·38	— ·83	92	36·07	Braemar
2·22	1·59	— ·63	72	·28	30	17	9·40	6·88	— 2·52	73	33·01	Aberdeen
1·49	1·73	+ ·24	116	·52	30	10	7·65	7·66	+ ·01	100	29·37	Cawdor
2·68	3·17	+ ·49	118	·95	6	7	19·03	22·69	+ 3·66	119	56·00	Invergarry
4·31	5·45	+1·14	127	·75	30	17	26·21	36·33	+10·12	139	86·50	Bendamph
1·81	2·20	+ ·39	122	·37	15	15	9·29	11·47	+ 2·18	123	31·60	Dunrobin Castle
...	2·18	...	...	·40	26	22	...	11·58	...	...	...	Castletown
3·71	3·90	+ ·19	105	·58	7	25	19·75	11·73	— 8·02	59	58·11	Killarney
2·56	3·60	+1·04	141	·56	6	21	12·47	7·35	— 5·12	59	39·30	Waterford
2·17	3·40	+1·23	157	·67	5	19	9·51	9·79	+ ·28	103	33·47	Hurdlestown
2·40	3·38	+ ·98	141	1·02	8	23	10·50	8·53	— 1·97	81	35·19	Abbey Leix
2·00	2·62	+ ·62	131	·38	2	22	7·99	6·28	— 1·71	79	27·75	Dublin
2·32	2·31	— ·01	100	·65	8	20	10·74	9·84	— ·90	92	37·04	Ballinasloe
4·74	6·26	+1·52	132	1·37	7	18	24·35	20·01	— 4·34	82	80·23	Kylemore House
2·90	3·39	+ ·49	117	·52	5, 30	22	15·86	15·46	— ·40	97	50·50	Enniscoe
2·59	2·81	+ ·22	108	·91	4	17	11·75	9·26	— 2·49	79	38·61	Seaforde
2·32	3·76	+1·44	162	·87	28	23	11·67	16·58	+ 4·91	142	41·20	Londonderry
2·25	3·15	+ ·90	140	·40	5	22	10·55	13·04	+ 2·49	124	37·85	Omagh

SUPPLEMENTARY RAINFALL, APRIL, 1907.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Abinger Hall	5·19	XI.	Rhayader, Tyrmynydd	...
,,	Ramsgate, West Cliff Villas	2·32	,,	Lake Vyrnwy	3·13
,,	Hailsham	3·76	,,	Llangyhanfal, Plâs Draw....	2·19
,,	Crowborough, Uckfield Lodge	3·99	,,	Criccieth, Talarvor	2·07
,,	Osborne, Newbarn Cottage.	...	,,	Llanberis, Pen-y-pass	...
,,	Emsworth, Redlands	4·23	,,	Lligwy	1·44
,,	Alton, Ashdell	4·62	,,	Douglas, Woodville	2·71
,,	Newbury, Welford Park	3·79	XII.	Stoneykirk, Ardwell House	2·55
III.	Harrow Weald, Hill House.	3·57	,,	Dalry, The Old Garroch	4·08
,,	Oxford, Magdalen College..	1·87	,,	Langholm, Drove Road	2·84
,,	Bloxham Grove	2·33	,,	Moniaive, Maxwelton House	2·67
,,	Pitsford, Sedgebrook	2·26	XIII.	N. Esk Reservoir [Penicuick]	2·25
,,	Huntingdon, Brampton	3·05	XIV.	Maybole, Knockdon Farm..	3·27
,,	Wisbech, Bank House	2·47	XV.	Campbeltown, Witchburn...	2·81
IV.	Southend Water Works	2·23	,,	Inveraray, Newtown	4·87
,,	Colchester, Lexden	3·12	,,	Ballachulish House	4·39
,,	Newport, The Vicarage	3·23	,,	Islay, Eallabus	3·54
,,	Rendlesham	3·10	XVI.	Dollar Academy	1·60
,,	Swaffham	3·03	,,	Loch Leven Sluice	1·51
,,	Blakeney	2·82	,,	Balquhidder, Stronvar	4·30
V.	Bishops Cannings	4·13	,,	Perth, Pitcullen House	1·66
,,	Ashburton, Druid House	6·36	,,	Coupar Angus Station	1·96
,,	Okehampton, Oaklands	5·88	,,	Blair Atholl	3·31
,,	Hartland Abbey	5·42	,,	Montrose, Sunnyside Asylum	1·57
,,	Lynmouth, Rock House	4·43	XVII.	Alford, Lynturk Manse	2·33
,,	Probus, Lamellyn	4·91	,,	Keith Station	2·21
,,	Wellington, The Avenue	4·93	XVIII.	N. Uist, Lochmaddy	1·54
,,	North Cadbury Rectory	4·52	,,	Alvey Manse	1·67
VI.	Clifton, Pembroke Road	3·95	,,	Loch Ness, Drumnadrochit.	1·51
,,	Ross, The Graig	3·11	,,	Glencarron Lodge	4·70
,,	Shifnal, Hatton Grange	2·11	,,	Fearn, Lower Pitkerrie	·90
,,	Cheadle, The Heath House.	1·39	XIX.	Invershin	2·20
,,	Blockley, Upton Wold	3·01	,,	Altnaharra	2·33
,,	Coventry, Kingswood	1·81	,,	Bettyhill	2·03
VII.	Market Overton	2·68	XX.	Dunmanway, The Rectory..	4·55
,,	Market Rasen	1·76	,,	Cork	2·99
,,	Bawtry, Hesley Hall	1·76	,,	Darrynane Abbey	4·31
VIII.	Neston, Hinderton Lodge...	1·01	,,	Glenam [Clonmel]	3·48
,,	Southport, Hesketh Park...	1·60	,,	Ballingarry, Gurteen	2·01
,,	Chatburn, Middlewood	1·69	,,	Miltown Malbay	2·89
,,	Cartmel, Flookburgh	2·17	XXI.	Gorey, Courtown House	2·39
IX.	Langsett Moor, Up. Midhope	2·82	,,	Moynalty, Westland	2·49
,,	Scarborough, Scalby	2·02	,,	Athlone, Twyford	2·71
,,	Ingleby Greenhow	3·19	,,	Mullingar, Belvedere	2·01
,,	Mickleton	1·25	XXII.	Woodlawn	2·58
X.	Bardon Mill, Beltingham	2·29	,,	Westport, Murrisk Abbey..	...
,,	Ewesley, Fallowlees	3·44	,,	Collooney, Markree Obsy..	3·12
,,	Ilderton, Lilburn Cottage...	3·09	,,	Mohill	2·23
,,	Keswick, York Bank	2·65	XXIII.	Enniskillen, Portora	2·13
XI.	Llanfrechfa Grange	3·57	,,	Warrenpoint, Summer Hill.	2·31
,,	Treherbert, Tyn-y-waun	5·97	,,	Banbridge, Milltown	2·62
,,	Carmarthen, The Friary	3·87	,,	Belfast, Springfield	2·34
,,	Castle Malgwyn [Llechryd].	4·00	,,	Bushmills, Dundarave	2·06
,,	Plynlimon	5·70	,,	Stewartstown, The Square..	2·28
,,	Tall-y-llyn	...	,,	Killybegs	3·95
,,	New Radnor, Ednol	2·89	,,	Horn Head	2·49

METEOROLOGICAL NOTES ON APRIL, 1907.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Temp. for Temperature; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

LONDON, CAMDEN SQUARE.—The brilliant weather of Easter gave way on 3rd to unsettled conditions, which lasted throughout the month, with copious R at frequent intervals. After 2nd the shade temp. reached 60° on three days only, but there were few frosts. Mean temp. 47°·3, or 0°·8 below the average. Duration of sunshine 104·2* hours, and of R 65·6 hours.

CROWBOROUGH.—Cold and wet, with occasional night frosts. R 1·84 in. above the average of 36 years, reducing the deficiency for the year to ·99 in. Mean temp. 46°. On 7th an inch and a half of S fell.

HARTLEY WINTNEY.—Very cold and wet, being the wettest April yet recorded here. In the second week the weather was stormy and unsettled, with slight TSS daily, and during the last week there was a bitter wind, which greatly retarded vegetation. Ozone was recorded daily, with a mean of 5·2.

TORQUAY.—Duration of sunshine 182·3* hours, or 1·7 hours above the average. Mean temp. 47°·7, or 0°·5 below the average. Mean amount of ozone 5·2.

NORTH CADBURY.—By far the wettest April in 11 years, the R being nearly double that of the previous three months. The mean max. temp. was very low, but the min. and number of frosts normal. The heaviest S of the winter. about three inches fell early on 7th.

BOLTON.—The pressure and mean temp. were close to the normal, the latter being 44°·2, or 0°·3 below the average, but the duration of sunshine, 70·4* hours, was remarkably low, 38·5 hours below the average, and the least in April since 1891. The weather throughout was dull and changeable.

SOUTHPORT.—The mean bar. was very low during the first half, but it was otherwise a normal month. Easterly winds generally till the 19th. Mean temp. 45°·7, or 0°·2 below the average. Duration of sunshine 163* hours, or 16 hours below the average. Duration of rainfall 38·3 hours.

HAVERFORDWEST.—A cold month, with large R, which fell mostly at night, Duration of sunshine 156·7* hours. Vegetation backward.

DOUGLAS.—Stormy, with more or less strong polar winds throughout, so that the backward vegetation made little progress in a generally ungenial month. S fell heavily for some hours on 6th.

DUMFRIES.—A cold bleak month, but without low. min. temp. Cold W. winds at the close, accompanied by blizzard like showers, occasioned a serious check on vegetation.

COUPAR ANGUS.—Bleak throughout, with cold N.W. winds. The R was normal, but the mean temp. 43°·0 was 1°·0 below the average.

DRUMNADROCHIT.—R ·35 in., and rain days 2, below the average of 21 years. On the whole it was sunny but with frequent cold winds, and on high land a good deal of S.

DUNMANWAY.—On the whole cold, with heavy showers and sometimes H, but bright sunshine was frequent.

DARRYNANE ABBEY.—Wet and changeable, with some fine warm days, but the last few days were very cold. R 21 per cent. above the average.

DUBLIN.—Cloudy, unsettled and rainy. Distinctly cold but for a warm spell between 22nd and 25th. Mean temp. 47°·2, or 0°·4 below the average. H on 4 days.

OMAGH.—Cold, wet and unsettled, with S on 26th and heavy H showers on 29th. Corn-crakes and swallows were seen on 30th.

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* Campbell-Stokes.

Climatological Table for the British Empire, November, 1906.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Max. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	60·1	22	29·7	19	51·9	41·6	43·9	90	80·2	28·0	4·20	17	...
Malta	...	...	...	...	...	...	...	...	...	...	...	...	...
Lagos	89·0	7*a*	72·0	26	86·6	75·6	74·7	76	160·0	70·0	1·37	9	5·7
Cape Town	86·5	1	50·4	17	74·3	57·4	52·3	63	...	...	·55	5	3·7
Durban, Natal ...	86·2	7	55·1	19	78·2	64·1	...	...	146·5	...	3·19	19	5·8
Johannesburg	82·1	2	42·9	16	70·9	51·5	50·1	70	160·8	41·5	5·34	12	4·7
Mauritius	88·1	30	61·0	7	82·4	65·1	61·6	67	148·1	54·4	·62	11	5·7
Calcutta...	86·4	3	59·5	26	82·7	65·4	64·8	74	148·8	54·0	·35	2	1·9
Bombay...	91·8	23	72·1	30	89·4	75·7	69·9	68	136·5	60·9	·00	0	1·4
Madras	90·9	6	68·7	27	85·7	72·5	71·9	83	143·5	65·6	6·47	15	5·9
Kodaikanal	65·5	17	45·8	22	60·8	49·5	50·5	88	126·8	37·2	10·93	20	7·4
Colombo, Ceylon ...	88·4	23	71·8	6	85·3	73·9	72·6	85	152·8	68·0	14·65	19	6·9
Hongkong	82·9	2	55·3	20	73·4	62·4	54·0	62	137·5	...	·18	4	4·9
Melbourne	87·3	17	40·6	5	67·0	49·5	47·7	72	148·2	36·2	2·47	13	7·8
Adelaide	90·4	8	44·3	6	73·2	52·8	48·2	57	148·0	41·1	2·45	11	6·4
Coolgardie	98·0	24	42·9	18	79·7	53·1	45·4	47	166·9	39·2	·99	6	3·4
Sydney	92·0	22	48·2	6	73·8	57·5	51·4	61	133·2	36·0	4·12	19	4·8
Wellington	67·5	23	41·0	16	61·4	48·9	47·2	73	143·0	34·0	4·69	14	6·2
Auckland	72·0	25	49·0	10	66·0	53·7	51·2	73	139·0	42·0	5·62	12	5·2
Jamaica, Negril Point.	89·1	16	68·0	26	85·7	72·8	72·3	84	...	...	2·77	6	...
Trinidad	90·0	sev1	78·0	9	87·6	71·1	73·5	83	162·0	66·0	5·00	12	...
Grenada	88·0	4, 5	72·0	25*b*	84·4	74·7	72·3	78	152·0	...	9·89	23	4·3
Toronto	53·6	18	21·6	14	...	...	31·4	79	...	...	1·68	13	7·0
Winnipeg	47·3	7	-10·0	20	...	...	...	...	...	...	1·87	12	7·0
St. John's, N.B. ...	54·6	19	15·3	30	...	...	...	...	...	...	5·21	14	7·0
Victoria, B.C.	56·1	9	30·4	29	...	...	...	...	...	...	6·13	16	7·0
Dawson	22·0	1	-41·0	30	...	...	...	...	...	...	1·55	8	6·0

a and 22, 23. *b* and 27, 30.

Johannesburg.—Rainfall above the average.

Mauritius.—Mean temp. of air 2°·0, dew point 2°·7, relative humidity 1·3 per cent., and R 1·18 in. below, averages. Mean hourly velocity of wind 8·7 miles, or 2·0 below average.

MADRAS.—TS on one day, distant T on 3 days and L on one other day. Bright sunshine 131·1 hours.

KODAIKANAL.—Bright sunshine 110 hours.

COLOMBO.—Mean temp. of air 78°·7, or 1°·2 below, of dew point 0°·3 above, and R 2·41 in. above, averages. Mean hourly velocity of wind 6·6 miles.

HONGKONG.—Mean temp. of air 67°·4. Bright sunshine 204·4 hours. R 1·53 in. below averages. Mean hourly velocity of wind 10 8 miles.

Adelaide.—Mean temp. of air 4°·1 below average, and coldest on record in 49 years. R heaviest on record for 49 years, except 1903.

Sydney.—Mean temp. of air 1°·2 below, and R 1·05 in. above, averages.

Wellington.—R 1·13 in. above the average.

Auckland.—Mean temp. slightly above, and R 2·00 in. above averages.

TRINIDAD.—R 1·98 in. below 43 years' average.